Application No. 09/324,253
Filed: June 2, 1999
TC Art Unit: 2633
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Claims

In the claims:

1. (Previously Presented) An optical frequency filter comprising: a frequency dependent disperser that disperses a frequency modulated input optical signal to form a dispersed signal having a plurality of frequencies;

a modulator that modulates at least one of the plurality of frequencies to generate a spatially mapped, dispersed signal; and

a frequency dependent combiner that combines the frequencies in the dispersed signal to form an intensity modulated output signal, wherein the transmitted power of light through the filter is a varying function with respect to frequency over a selected bandwidth.

2. (Canceled)

3. (Previously presented) The optical frequency filter of Claim 1, wherein transmission of light through the filter is a monotonically varying function with respect to frequency over the selected bandwidth.

4. (Previously presented) The optical frequency filter of Claim 1, wherein the transmission of light through the filter is linear as a function of frequency over the selected bandwidth.

5. (Previously presented) The optical frequency filter of Claim 1, wherein the modulation of light depends on time.

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PAGE 5/14 * RCVD AT 7/26/2005 5:15:23 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/28 * DNIS:2738300 * CSID:6176950892 * DURATION (mm-ss):03-10

6. (Previously presented) The optical frequency filter of Claim 1, further comprising a circulator that is optically coupled to an input optical waveguide and the disperser.

7. (Original) The optical frequency filter of Claim 1, wherein the frequency dependent disperser comprises a device having time delays which depend on frequency.

8. (Previously presented) The optical frequency filter of Claim 7, wherein the disperser comprises a fiber grating having a Bragg frequency that is an exponential function of position.

9. (Previously presented) The optical frequency filter of Claim 1, wherein the modulator and the combiner comprise a grating.

10. (Original) The optical frequency filter of Claim 1, wherein the frequency dependent disperser comprises a device having a plurality of one of positions and angles which depend on frequency.

11. (Previously presented) The optical frequency filter of Claim 1, wherein the frequency dependent disperser comprises a diffraction grating.

12. (Previously presented) The optical frequency filter of Claim 1, wherein the frequency dependent disperser comprises a prism.

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PAGE 6/14 * RCVD AT 7/26/2005 5:15:23 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/28 * DNIS:2738300 * CSID:6176950892 * DURATION (mm-ss):03-10

13. (Previously presented) The optical frequency filter of Claim 1, wherein the frequency dependent disperser comprises an array of waveguide gratings.

14. (Previously presented) The optical frequency filter of Claim 1, wherein the frequency dependent disperser comprises a modified waveguide grating router.

15. (Previously presented) An optical frequency filter comprising:

a frequency dependent disperser that disperses a frequency modulated input optical signal to form a dispersed signal having a plurality of frequencies;

a modulator comprising an attenuator that modulates at least one of the plurality of frequencies; and

a frequency dependent combiner that combines the frequencies in the dispersed signal to generate an intensity modulated output signal, wherein the transmitted power of light through the filter is a varying function with respect to frequency over a selected bandwidth.

16. (Previously presented) In an optical communications network, a frequency modulation (FM) to intensity modulation (1M) converter comprising:

a frequency dependent disperser that disperses a frequency modulated light signal into a plurality of frequencies;

a modulator that modulates at least one of the plurality of frequencies to generate a spatially mapped, dispersed signal; and

a frequency dependent combiner that combines the frequencies in the dispersed signal to form an intensity modulated output

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PAGE 7/14 * RCVD AT 7/26/2005 5:15:23 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/28 * DNIS:2738300 * CSID:6176950892 * DURATION (mm-ss):03-10

signal, wherein the transmission of light through the converter is a varying function with respect to frequency over a selected bandwidth.

17. (Previously presented) The converter of Claim 16 wherein transmission of light through the converter is linear as a function of frequency over the selected bandwidth.

18. (Original) The converter of Claim 16 further comprising an input optical fiber, a fiber grating and an output optical fiber.

19. (Previously presented) The converter of Claim 16 wherein the disperser and combiner comprises a fiber grating.

20. (Original) The converter of Claim 18 wherein the modulator is coupled to at least one of the disperser and combiner.

21. (Original) The converter of Claim 16 further comprising a fiber grating and at least one device that allows light to propagate in a predetermined direction.

22. (Original) The converter of Claim 21 wherein the device that allows light to propagate in a predetermined direction further comprises at least one circulator, the circulator being coupled to the disperser and the combiner.

23. (Original) The converter of Claim 16 further comprising a mirror and a grating that forms the disperser and the combiner

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PAGE 8/14 * RCVD AT 7/26/2005 5:15:23 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/28 * DNIS:2738300 * CSID:6176950892 * DURATION (mm-ss):03-10

such that the mirror reflects the dispersed light from the grating onto the grating.

24. (Previously presented) The converter of Claim 23, wherein the mirror is disposed at an angle with respect to the grating such that the referenced, dispersed light is offset from the frequency modulated light signal which forms the input to the converter.

25. (Original) The converter of Claim 23, wherein the grating comprises a waveguide grating router.

26. (Original) The converter of Claim 23, wherein the grating comprises a diffraction grating.

27. (Previously presented) An optical communication system comprising:

an optical FM source operating in communication with a transmitter, the source being further capable of outputting a FM optical signal;

an optical transmission link for carrying the FM optical signal to a receiver;

a FM to 1M converter in communication with the receiver, the converter including a frequency dependent disperser to disperse light associated with the FM optical signal such that a plurality of frequencies are coupled to a modulator that modulates an intensity of one or more frequencies to generate a spatially mapped, dispersed signal and a frequency dependent combiner to produce an 1M output signal that is linear with frequency over a selected bandwidth; and

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PAGE 9/14 * RCVD AT 7/26/2005 5:15:23 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/28 * DNIS:2738300 * CSID:6176950892 * DURATION (mm-ss):03-10

a detector to detect 1M signals.

28. (Previously presented) A method to convert input FM optical signals to 1M optical output signals, comprising the steps of:

dispersing an FM input optical signal using a frequency dependent disperser to form a dispersed optical signal having a plurality of frequencies;

modulating the dispersed optical signal using a modulator that spatially maps and alters a magnitude of one of the plurality of frequencies; and

combining the dispersed optical signal using a frequency dependent combiner to form an intensity modulated output signal wherein the intensity modulated output signal is a varying function with respect to frequency over a selected bandwidth.

29. (Original) The method of Claim 28, wherein the intensity modulated output signal is linear with frequency over a selected bandwidth.

30. (Previously presented) The method of Claim 28, providing a frequency dependent modulator that modulates the dispersed frequencies as a function of spatial position such that the modulated output signal is linear with frequency.

31. (Previously presented) A method of filtering a received optical signal comprising the steps of:

dispersing an FM input optical signal using a frequency dependent disperser to form a dispersed optical signal having a plurality of frequencies;

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PAGE 10/14 * RCVD AT 7/26/2005 5:15:23 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/28 * DNIS:2738300 * CSID:6176950892 * DURATION (mm-ss):03-10

modulating the dispersed optical signal using a modulator that modulates one of the plurality of frequencies using spatial mapping; and

combining the optical signal using a frequency dependent combiner to form an 1M output signal that varies with frequency over a selected bandwidth.

32. (Original) The method of Claim 31 further comprising collecting the input optical signal from a sample and forming a spectrum with the output signal.

33. (Previously presented) A method of filtering a received optical signal comprising the steps of:

forming a plurality of filters in series or parallel, each filter having a disperser, an attenuator and a combiner and comprising the steps of:

dispersing an FM input optical signal using a frequency dependent disperser to generate a dispersed optical signal having a plurality of frequencies;

modulating the dispersed optical signal using a spatial mapping modulator that modulates one of the plurality of frequencies; and

combining the optical signal using a frequency dependent combiner to generate an 1M output signal that varies with frequency over a selected bandwidth.

34. (Previously presented) A method to shape the transmission of a an optical signal with respect to frequency comprising the steps of:

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PAGE 11/14 * RCVD AT 7/26/2005 5:15:23 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/28 * DNIS:2738300 * CSID:6176950892 * DURATION (mm-ss):03-10

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dispersing an FM input optical signal using a frequency dependent disperser to form a dispersed optical signal having a plurality of frequencies;

modulating the dispersed optical signal using a modulator that modulates at least one of the plurality of frequencies to generate a spatially mapped, dispersed signal; and

combining the dispersed optical signal using a frequency dependent combiner to form an 1M output signal that is linear with frequency over a selected bandwidth.

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PAGE 12/14 * RCVD AT 7/26/2005 5:15:23 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/28 * DNIS:2738300 * CSID:6176950892 * DURATION (mm-ss):03-10